

66478

~~40(4)~~ 5.1600

SOV/20-129-1-24/64

AUTHORS: Gonikberg, M. G., Tsiklis, D. S., Opekunov, A. A.

TITLE: On the Problem of Reinforcement of High Pressure Containers

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 1,  
pp 88 - 90 (USSR)

ABSTRACT: Recently a method of replacing the tensile stresses in constructions by compressive stresses, is applied in the construction of high pressure apparatus. The fact is used as well, that the compressive strength of materials like tungsten carbide and hard steels is by 3 to 4 times larger than tensile strength. This principle for instance, is applied to that construction, which is known under the name "tetrahedral anvil" and which makes it possible already now to produce pressures of 200000 atmospheres within the apparatus at very high temperatures. In this construction 4 pistons move in a highly viscous medium (pyrophyllite) towards a common center. The triangular plane frontal areas of these pistons (with a pyrophyllite intermediate layer between them) form a tetrahedral high-pressure "container". 2 problems are solved by such a construc-

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On the Problem of Reinforcement of High Pressure  
Containers

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tion: The backing of the moving piston and the production of a high-pressure container, with extremely high strains and high temperatures. These problems, however, may be solved separately, using the same principle, which underlies the tetrahedral anvil. First the construction of a high-pressure container with high strength is discussed. At the internal walls of the container a plastic layer is formed, which is fixed by an elastic layer. With increasing extension of the plastic layer, the elastic layer becomes thinner and thinner and, at a certain pressure, a break occurs. As was shown by experiments, high pressure containers break from outside. Now, a high pressure container may be assumed, which is produced of 2 layers, of an external elastic bandage and of an internal layer, which is composed of several hard wedges (compare R. V. Mil'vitskiy (Ref 3)). The material of these wedges reacts not to extension, but to pressure and, therefore, withstand considerably higher pressure than the walls of a customary cylinder. An apparatus with a high-pressure container, which is schematically illustrated by a picture, was developed and built by the authors,

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On the Problem of Reinforcement of High Pressure Containers

on the basis of this principle. 4 wedges with spherical surfaces, fit together by careful grinding (which represent the high-pressure container), are inside of a steel-bandage. The wedges form a channel, which contains a pyrophyllite-cylinder, with the sample to be investigated. This construction withstands pressures of more than 50000 atmospheres at high temperatures. In this construction the wedges work almost without backing. The results of such an experiment (polymorphic conversion of bismuth) is illustrated by a diagram. The pressure, attained during this experiment, exceeds the conversion pressure of bismuth almost by the double. Repeated experiments at ~ 50000 atmospheres and at temperatures of 1500°, over many hours, caused no noticeable alteration at the internal surface of the wedges. By producing a backing for the moving anvils, by production of the pistons and the wedges from hard alloys, the maximum attainable pressures may be increased. M. D. Pushkinskiy took part in the investigations. There are 3 figures and 3 references, 1 of which is Soviet.

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66478

On the Problem of Reinforcement of High Pressure  
Containers

SOV/20-129-1-24/64

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii  
nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelins-  
kiy of the Academy of Sciences, USSR). Gosudarstvennyy institut  
azotnoy promyshlennosti (State Institute of Nitrogen Industry)

PRESENTED: July 3, 1959, by B. A. Kazanskiy, Academician

SUBMITTED: June 30, 1959

Card 4/4

PHASE I BOOK EXPLOITATION

SOV/4373

Gonikberg, Mark Gertsovich

**Khimicheskoye ravnovesiye i skorost' reaktsiy pri vysokikh davleniyakh**  
(Chemical Equilibrium and Rate of Reactions at High Pressures) 2d ed., rev. and enl.  
Moscow, Izd-vo AN SSSR, 1960. 271 p. Errata slip inserted. 6,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut organicheskoy khimii.

Eds.: B.A. Kazanskiy, Academician and A.M. Rubinshteyn, Professor; Ed. of Publishing House: A.L. Bankvitser; Tech. Ed.: Ye. V. Makmi.

**PURPOSE:** This book is intended for scientists and industrial engineers interested in processes taking place at high temperatures and pressures.

**COVERAGE:** The monograph, a second edition, reviews recent results of research on the influence of pressure on chemical equilibrium, reaction rates, and the composition of products of complex chemical processes. Much of the research was carried out by the author and his colleagues at the Institute for Organic Chemistry of the AS USSR, with a view to studying the mechanism and transformation of state

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APPROVED FOR RELEASE: 06/13/2000 (Cont.) CIA-RDP86-00513R000516020002-5

in a number of chemical reactions which occur at high pressures, e.g., the production of industrial diamonds and the application of high-temperature and pressure techniques to the synthesis of high polymers and other valuable products. No personalities are mentioned. There are 36 figures, 83 tables, and 487 references: 311 Soviet, 141 English, 11 French, and 24 German.

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PART I. CHEMICAL EQUILIBRIUM AT HIGH PRESSURES	
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Card 2/8

Study of the Effect of Hydrogen Pressure  
on the Rate of Heterogeneous Catalytic  
Isomerization of Cyclohexane. Communication 2.  
Dependence of the Cyclohexane Isomerization  
Rate on Partial Hydrogen Pressure, Temperature,  
and WS<sub>2</sub> Grain Size

S/062/60/000/006/016/025/XX  
B020/B060

is the problem studied in the article under consideration. The said passage can be established from variations of the apparent activation energy with temperature, and experiments were made to this effect at 320°, 340°, 380°, 410°, and 430°C, for different partial hydrogen pressures (Table 1). Logarithms ( $\log k_{pH_2}$ ) of the rate constants are given as a function of the hydrogen partial pressures (Fig. 1). The dependence of the logarithm of the reaction rate constant on temperature is shown in Fig. 2. The values of  $\log k_0$  from equation (1)  $\log k_{pH_2} = \log k_0 - cp_{H_2}$ , where  $k_0$  is the value of the reaction rate constant extrapolated for  $p_{H_2} = 0$ , and  $c$  is a temperature-dependent empirical constant, as well as the values for  $d$  from equation (2) of the reaction rate

$\omega = k_0 p_{C_6H_{12}}^{0.4} e^{-dp_{H_2}}$ , are given in Table 2. Data on the effect of the

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Study of the Effect of Hydrogen Pressure  
on the Rate of Heterogeneous Catalytic  
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Dependence of the Cyclohexane-Isomerization  
Rate on Partial Hydrogen Pressure, Temperature,  
and  $WS_2$  Grain Size

S/062/60/000/006/016/025/XX  
B020/B060

catalyst grain size on cyclohexane isomerization at  $340^\circ$  and 50 at., are indicated in Table 3. Constants a and b from the empirical equation (3)

$k_{pH_2} = a + b \cdot p_{H_2}^{-0.5}$  are given in Table 4. Results obtained show that the

reaction in the temperature range  $320^\circ$  to  $380^\circ$  takes place in the empirical region, and above  $380^\circ$  passes over into the diffusion region. The apparent activation energy in the kinetic region amounts to about 30 kcal/mole. The retardation of cyclohexane isomerization with increasing partial hydrogen pressure is not due to diffusion factors, but is characteristic of the kinetic region of the reaction course. Ye. A. Udaltsova, laboratory assistant, and Yu. I. Ryzhov, mechanic, took part in the investigation. There are 3 figures, 4 tables, and 2 Soviet references.

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Study of the Effect of Hydrogen Pressure  
on the Rate of Heterogeneous Catalytic  
Isomerization of Cyclohexane. Communication 2.  
Dependence of the Cyclohexane Isomerization  
Rate on Partial Hydrogen Pressure, Temperature,  
and WS<sub>2</sub> Grain Size

S/062/60/000/006/016/025/XX  
B020/B060

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii  
nauk SSSR (Institute of Organic Chemistry imeni N. D.  
Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: December 22, 1958

Card 4/4



S/062/60/000/007/009/017/XX  
B004/B064

AUTHORS: Gonikberg, M. G., and Levitskiy, I. I.

TITLE: Study of the Influence of Hydrogen Pressure on the Rate of the Heterogeneous-catalytic Isomerization of Cyclohexane. Communication 3. Analysis of the Reasons for the Inhibition of Cyclohexane Isomerization When Increasing the Hydrogen Pressure

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 7, pp. 1170 - 1177

TEXT: The study of the isomerization of cyclohexane to methyl cyclopentane in the presence of  $WS_2$  (Refs. 1,2) resulted in a considerable reduction of the rate constant when increasing the partial pressure of  $H_2$  from 50 to 250 atm. This effect became smaller when the temperature was increased from  $320^\circ$  to  $380^\circ C$ . The authors aimed at finding the reasons for this effect and

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Study of the Influence of Hydrogen  
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of Cyclohexane. Communication 3. Analysis of the Reasons for the  
Inhibition of Cyclohexane Isomerization When Increasing the  
Hydrogen Pressure

S/062/60/000/007/009/017/XX  
B004/B064

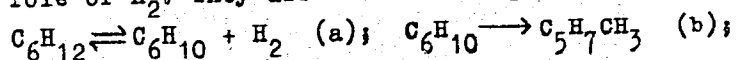
made three assumptions for this purpose: 1) The adsorption equilibrium of cyclohexane is shifted under the action of the hydrostatic pressure. 2) Cyclohexane adsorption is reduced by covering the surface of the catalyst with adsorbed  $H_2$ . 3) Hydrogen exerts a specific influence upon the isomerization process. In the course of four test series at  $340^\circ C$  with a hydrogen - nitrogen mixture or pure hydrogen and pressures between 50 and 200 atm, it was found that at constant partial pressure of hydrogen, the rate of isomerization is independent of the total pressure. Thus, assumption 1) was disproved. The study of adsorption as a function of temperature and pressure showed the following result: there is no basic difference between the adsorption of  $H_2$  and of  $N_2$  between  $300^\circ$  and  $400^\circ C$  and 10 - 100 atm. Thus, assumption 2) became improbable.

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Study of the Influence of Hydrogen  
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Hydrogen Pressure

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B004/B064

Therefore, the authors discussed the third assumption of a specific  
role of  $H_2$ . They assume three stages of the process:



$C_5H_7CH_3 + H_2 \rightleftharpoons C_5H_9CH_3 \quad (c)$ . On the assumption of an equilibrium  
in the stage (a) and an activating action of the adsorbed hydrogen,  
they arrive at the equation

$$w = kKf(\alpha + \beta/p_{H_2}^{0.5})^{0.5} p_{C_6H_{12}}$$

which gives a good representation of the experimental data.  $w$  denotes  
the reaction rate,  $k$  the rate constant of the stage (b),  $K$ , the

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Study of the Influence of Hydrogen  
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Heterogeneous-catalytic Isomerization  
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equilibrium constant of the stage (a),  $f$ , a proportionality coefficient,  
 $\alpha$  and  $\beta$  are empirical coefficients. The ratio  $\alpha/\beta$  could be determined  
only approximatively. It was about 0.1 at 300° C, and 0.2 at 400° C.  
The authors mention L. R. Krichevskiy, R. S. Kal'var'skaya,  
M. I. Temkin, N. D. Zelinskiy, M. B. Turova-Polyak, and R. D.  
Obolentsev. The laboratory assistant Ye. A. Udal'tsova and the  
mechanic Yu. I. Ryzhov took part in the work. There are 2 figures,  
1 table, and 18 references: 12 Soviet, 5 US, and 1 French.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo  
Akademii nauk SSSR  
(Institute of Organic Chemistry imeni N. D. Zelinskiy  
of the Academy of Sciences USSR)

SUBMITTED: December 22, 1958

Card 4/4

YERSHOV, Yu.A.; MILLER, V.B.; NEYMAN, M.B.; GONIKBERG, M.G.

Kinetics of the reaction  $n\text{-C}_3\text{H}_7\text{I} + \text{KI}^*$  in nonaqueous solvents  
at pressures up to 3000 kg./cm.<sup>2</sup>. Izv. AN SSSR. Otd. khim. nauk  
no. 12:2103-2106 D '60. (MIRA 13:12)

1. Institut khimicheskoy fiziki AN SSSR i Institut organicheskoy  
khimii im. N.D. Zelinskogo AN SSSR.  
(Propane) (Iodine—Isotopes)  
(Potassium iodide)

VINNIK, M.I., kand.khimicheskikh nauk. GONIKBERG, M.G., doktor khimicheskikh nauk

Mechanism of heterolytic reactions. Vest.AN SSSR 30 no.9:  
115-118 S '60. (MIRA 13:9)  
(Chemical reactions, Rate of)

5(4), 5(3)  
AUTHOR:

Gonikberg, M. G.

S/076/60/034/01/039/044  
B004/B007

TITLE:

The Problem of the Mechanism of the Reactions of Diene<sup>7</sup>  
Synthesis

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 1, pp 225 - 226  
(USSR)

ABSTRACT:

The author criticizes the conclusions drawn by C. Walling and J. Peisach (Ref 2) from their paper on the kinetics of the dimerization of isoprene. Accordingly, an essential difference between the change in volume  $\Delta v^{\ddagger}$  in the formation of the activated complex and the change in volume  $\Delta v$  in the formation of a dimer was found to exist for isoprene. This indicates a two-stage development of the reaction with the formation of a biradical as intermediary compound. The research scientists drew the conclusion that this concept holds also for the dimerization of cyclopentadiene. The author proves this to be wrong by basing on reference 3 and the paper which he wrote together with L. V. Vereshchagin (Ref 4), according to which in the dimerization of cyclopentadiene the difference

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The Problem of the Mechanism of the Reactions of Diene Synthesis S/076/60/034/01/039/044  
B004/B007

between  $\Delta v^*$  and  $\Delta v$  is small and lies within the error limit. Therefore, no formation of a biradical occurs. The author thanks Ya. K. Syrkin and A. S. Onishchenko for discussing his conclusions. There are 7 references, 4 of which are Soviet. (✓)

ASSOCIATION: Akademiya nauk SSSR Institut organicheskoy khimii im. N. D. Zelinskogo (Academy of Sciences, USSR Institute of Organic Chemistry imeni N. D. Zelinskiy)

SUBMITTED: March 31, 1959

Card 2/2



67912

5(3) 5.3200

S/020/60/130/03/017/065  
B011/B016

AUTHORS: Konikberg, M. G., El'yanov, B. S.

TITLE: Role of the Solvent in Menshutkin's Reactions

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 3, pp 545-548 (USSR)

ABSTRACT:

The problem mentioned in the title is a partial problem of the reaction mechanism of nucleophilic substitution in the saturated carbon atom. In the present paper investigation results of one of Menshutkin's reactions are described, viz. the reaction of pyridine with ethyl iodide  $C_5H_5N + C_2H_5I \rightarrow C_5H_5NC_2H_5I$ , dissolved in nitro-benzene and cyclohexanone at 50° and under a pressure of up to 2000 kg/cm<sup>2</sup>. Figure 1 shows a device for determining the compressibility of the two solvents. To obtain the rate constant, the experimental results were plotted in a diagram in coordinates  $\frac{1}{b-x} + B\tau$ , where  $B = \frac{b-a}{2} \left[ \frac{1}{(b-x)^2} - \frac{1}{b^2} \right]$ , a and b the initial concentrations of pyridine and ethyl iodide, x = the concentration of N-ethyl pyridinium iodide, and  $\tau$  = time. Straight lines resulted in this connection (Fig 2).

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Role of the Solvent in Menshutkin's Reactions

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B011/B016

From their slope the rate constants of the bimolecular reaction at different pressures were calculated. The values of these constants are given in table 1. Table 2 contains the data for  $\Delta V$  (change in volume on formation of 1 mole of the reaction product from the two components) and for the dissociation degree  $\alpha$  of N-ethyl pyridinium iodide at 50°. The analysis of the experimental results based upon the assumptions of the authors led to the following conclusions: 1) The number of molecules which solvate the activated complex, is 1/11 up to 1/8 of the molecules in solvate sheaths of iodine- and N-ethyl pyridinium ions. 2) An undissociated molecule is far less solvated than the ions of the reaction product. This is due to a considerable decrease in volume on dissociation of the electrolytes. M. D. Pushkinskiy and N. K. Shvedov took part in this investigation. There are 3 figures, 2 tables, and 6 references, 3 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

Card 2/3

20483 S/020/60/132/02/30/067  
B011/B002

5.3830  
AUTHORS:

Gonikberg, M. G., Zhulin, V. M., El'yanov, B. S.

TITLE:

On the Problem of the Connection Between the Crystallization of Aldehydes and the Development From Them of Polyoxymethylene-type Polymers

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 2, pp. 353-356

TEXT: It was the main purpose of this paper to find out whether the original crystallization of butyraldehyde is necessary for its polymerization under high pressure. Butyraldehyde first was purified by its transformation into parabutyr-aldehyde. The experiments were conducted in a multiplier with two windows (Fig. 1), which was provided for 8000 kg/cm<sup>2</sup> at normal temperature. A soldered up lead phial with butyraldehyde was introduced into the canal of the high-pressure block of the multiplier. The canal was filled with water - glycerin (1:1) and the required pressure was produced. The solid polymer was not soluble in acetone and alcohol, and little soluble in benzene, chloroform and CCl<sub>4</sub>. The published data show that the solid polymer develops by a pressure increase from 4200 to 5200 kg/cm<sup>2</sup>. The addition of benzoylperoxide accelerates this process. The authors doubt

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On the Problem of the Connection Between the  
Crystallization of Aldehydes and the Development From  
Them of Polyoxymethylene-type Polymers

S/020/60/132/02/30/067  
B011/B002

whether the polymerization of butyraldehyde is due to its crystallization followed by melting (as it is the case with acetaldehyde). Repeated freezing and melting under atmospheric pressure did not cause polymerization. The experiments in the multiplier with windows showed that butyraldehyde polymerizes under pressure without preceding crystallization. Experiments conducted by the authors on the action of various admixtures to polymerization and depolymerization of the solid polymers of butyraldehyde will be published separately.  $\sim 1.3\%$  of water and 5% of propyl alcohol reduce the yield in solid polymers considerably. Hydroquinone (1.5%-3%) inhibits the reaction. Dinitrile of azo-isobutyric acid does not accelerate the polymerization noticeably. The polymers obtained at a pressure of 6300 kg/cm<sup>2</sup> were solid, plastic substances unstable under atmospheric pressure. Some weight% of quinone and hydroquinone added to the polymer bring about its stabilization. At room temperature, the polymer thus keeps several months if exposed to air. Equilibrium shift under the influence of pressure, is one of the main factors for the development of solid polymers of butyraldehydes under pressure. The authors conclude that a comparatively small increase in pressure may lead to a considerable equilibrium shift in the polymerization reaction. Further investigations by the authors are planned as to the problem why the

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On the Problem of the Connection Between the  
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B011/B002

polymerization sets in at a pressure similar to that required for the  
crystallization of the aldehyde at room temperature. There are 1 figure and  
15 references, 1 of which is Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk  
SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the  
Academy of Sciences, USSR)

PRESENTED: January 13, 1960, by B. A. Kazanskiy, Academician

SUBMITTED: January 12, 1960

Card 3/3

54300

1043, 1142, 2209, 2108

23684

S/030/61/000/005/004/012  
B105/B202

AUTHOR: Gonikberg, M. G., Doctor of Chemical Sciences

TITLE: Mechanism of chemical reactions and high pressures

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 5, 1961, 39 - 45

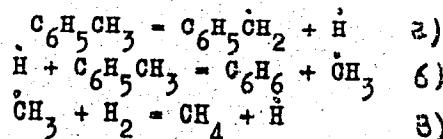
TEXT: The author studies the effect of pressure on the rate and the direction of chemical reactions. In recent years, important results could be obtained in this field, especially with respect to the explanation of the mechanism of the liquid phases of the reactions of organic compounds. Homogeneous destructive hydrogenation of the alkyl benzenes can be regarded as an example of the use of high pressure for studying the mechanism of reactions taking place in the gas phase at high temperatures. The studies made at the Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences USSR) which were made in a pressure range of up to 1350 atm showed that the reaction constitutes a complex radical chain mechanism comprising above all the following stages:

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S/030/61/000/005/004/012  
B105/B202

Mechanism of chemical reactions .....



On the basis of the theory of the transition state the rate constant of the chemical reaction can be determined from the equation

$$k = \kappa \frac{KT}{h} K^* \quad (1)$$

where K and h are the Boltzmann and Planck constants, respectively, and  $\kappa$  the transfer coefficient.

$$\left( \frac{\partial \ln k}{\partial p} \right)_T = - \frac{\Delta v^\ddagger}{RT}$$

(2) where  $\Delta v^\ddagger$  is the change of the volume, R the gas constant, T the absolute temperature, is obtained by taking the logarithm of equation (1) and by deriving the pressure at constant temperature (under the assumption that  $\kappa$  is independent of pressure) In accordance with the assumption by N. D. Zelinskiy and M. B. Turova-Polyak (1932) the following

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-0004

S/030/61/000/005/004/012

B105/B202

Mechanism of chemical reactions .....

reaction of dehydrogenation under separation of hydrogen is mentioned:  
 $C_5H_9CH_4 \rightarrow C_5H_7CH_3 + H_2$ . The reaction taking place via a cyclic activated

complex was described among others by the author and L. V. Vereshchagin. The author regards the reactions of Menshutkin as the classical example of the effect of the solvent on the rate of chemical process. Together with V. M. Zhulin and V. P. Butuzov the author made experimental studies of reactions at superhigh pressures where pressures of up to 30.000 atm at temperatures up to 350°C were applied for several hours. The author and A. I. Kitaygorodskiy examined experimental data on the effect of pressure on the rate of various reactions of Menshutkin. B. S. El'yanov and the author also made studies at the Institute of Organic Chemistry. The number of publications which are devoted to the study of the effect of high pressures on the rate and the direction of chemical reactions continuously increases in many countries. Finally, the author expresses his hope that this new method of studying the mechanism and the transition state in chemical reactions will be widely applied in the chemical laboratories of the scientific research institutes and in schools of higher learning.

Card 3/3



GONIKBERG, M.G.; LI GUAN-NYAN' [Li Kuang-nien]

Homogeneous destructive hydrogenation of propylphenols under hydrogen pressure. Izv.AN SSSR Otd.khim.nauk no.3:491-495 Mr '61.

(MIRA 14:4)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.  
(Phenols) (Hydrogenation)

EL'YANOV, B.S.; GONIKBERG, M.G.

Relationship between the rate constants and equilibrium constants  
of the reactions taking place in solutions under pressure. Izv.AN  
SSSR.Otd.khim.nauk no.5:934-935 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Chemical reaction, Rate of)

GONIKBERG, M.G.

Prospects for the application of high pressure in the chemical  
industry. Khim.prom. no.8:545-548 Ag '61. (MIRA 14:8)  
(Chemical reaction, Rate of) (Pressure)

GAVRILOVA, A.Ye.; GONIKBERG, M.G.

Homogeneous destructive hydrogenation of butylphenols under hydrogen pressure. Izv. AN SSSR. Otd.khim.nauk no.9:1691-1695 S '61.  
(MIRA 14:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Phenol) (Hydrogenation)

GONIKBERG, M.G.; GAVRILOVA, A.Ye.; NIKITENKOV, V.Ye.

Homogeneous destructive hydrogenation of xylenes. Izv. AN SSSR.  
Otd.khim.nauk no.9:1711-1713 S '61. (MIRA 14:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Xylene) (Hydrogenation)

S/081/61/000/021/060/094  
B138/B101

AUTHORS: Gonikberg, M. G., Dorogochinskiy, A. Z., Mitrofanov, M. G.,  
Gavrilova, A. Ye., Kupriyanov, V. A., Mikhaylovskiy, V. K.,  
Vovk, L. M.

TITLE: Homogenous demethylation of toluene. Basic characteristics  
of the process at 750 to 790°C

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 319, abstract  
21L34 (Neftekhimiya, v. 1, no. 1, 1961, 46 - 53)

TEXT: The homogenous demethylation of toluene (I) in a flow system is  
studied at temperatures of 750 to 790°C and pressures of  $\leq 40$  at. At a  
volumetric feed rate of 5 to 7 hr<sup>-1</sup> the conversion of I into C<sub>6</sub>H<sub>6</sub> is as  
much as 75 to 80 % in one run and the C<sub>6</sub>H<sub>6</sub> yield is 90 mole%, calculated  
from the amount of I which has undergone reaction. By rectifying the  
products of the reaction in a column with a theoretical efficiency of 20

✓

Card 1/2

Homogenous demethylation of toluene...

S/081/61/000/021/060/094  
B138/B101

plates, very high purity  $C_6H_6$  is produced, and a small quantity of a mixture of high boiling-point aromatic hydrocarbons containing  $\geq 50\%$  diphenyl. The possibility is discussed, of using the bimolecular reaction equation to provide an approximate description of the kinetic laws governing this process. [Abstracter's note: Complete translation.] ✓

Card 2/2

DOROGUCHINSKIY, A.Z.; GONIKBERG, M.G.; MITROFANOV, M.G.; KUPRIYANOV, V.A.;  
VOVK, L.M.

Homogenous demethylation of toluene. Report No. 2. Experiments with gas cycling. Neftekhimiya 1 no.4:501-504  
Jl-Ag '61. (MIRA 16:11)

1. Groznenskiy neftyanoy nauchno-issledovatel'skiy institut  
i Institut organicheskoy khimii AN SSSR imeni N.D.  
Zelinskogo.



ZHULIN, V.M.; GONIKBERG, M.G.

Polymerization of aldehydes at high pressures. Part 1: Polymerization of butyraldehyde under pressure. Vysokom. soed, 3 no.2:262-267 F '61. (MIRA 14:5)

1. Institut organicheskoy khimii imeni N. D. Zelinskogo AN SSSR.  
(Butyraldehyde) (Polymerization)

GONIKBERG, M.G.; ZHULIN, V.M.

Polymerization of aldehydes at high pressures. Part 2: Mechanism  
of butyraldehyde polymerization under pressure. Vysokom. sped. 3  
no.2:268-275 F '61. (MIRA 14:5)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.  
(Butyraldehyde)  
(Polymerization)

GONIKBERG, M. G.

Mechanism of chemical reactions and high pressures. Analele chimie 16  
no.4:56-63 Q-D '61.

(Chemical reactions)  
(High-pressure research)

GONIKBERG, M.G., doktor khim.nauk

High pressures and the mechanism of chemical reactions. Vest.AN SSSR  
31 no.5:39-45 My '61. (MIRA 14:6)  
(Chemical--Mechanism) (Pressure)

S/020/61/137/003/020/030  
B103/B208

AUTHORS: Levitskiy, I. I. and Gonikberg, M. G.  
TITLE: Effect of oxygen and water on hydrogenation and isomerization activity of the tungsten - sulfide catalyst

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 3, 1961, 609-611

TEXT: The objective of the present study is to explain the influence of a) oxygen- and b) water traces upon the activity of the industrial  $WS_2$  catalyst. For this purpose, the authors have studied (Ref. 2:

Izv. AN SSSR, OKhN, 1959, 611) 1) the hydrogenation of benzene, and 2) the isomerization of cyclohexane under hydrogen pressure by applying the continuous method. They used commercial electrolytic  $H_2$  with an  $O_2$  content up to 0.1% in unpurified state, or freed from  $O_2$  by means of granulated copper. All experiments were conducted on one single catalyst sample (28 g, 12 ml, grain size 3-5 mm, mixed with 60 ml porcelain scrap of equal size). Ad 1): Hydrogenation temperature was  $310^\circ C$  (according to

Card 1/6

Effect of oxygen and water on ...

S/020/61/137/003/020/030  
B103/B208

✓

TOCT (GOST) no. 3022-45), pressure 250 atm. Ad 2): The temperature was 370°C, the pressure 150 atm. Tables 1 (benzene hydrogenation) and 2 (cyclohexane isomerization) present the results. The authors conclude from them that: A) the catalyst is considerably activated by using purified H<sub>2</sub> in case 1); B) the effect of purified H<sub>2</sub> is reverse in case 2), although not to such a high extent as in case 1); C) the above effect is reversible in both cases if purified and unpurified H<sub>2</sub> are used alternately. Further experiments of the authors permit the assumption that the hydrogenation activity of the catalyst is not suppressed by the water formed from O<sub>2</sub>, but by O<sub>2</sub> itself. Water, on the other hand, induced no change of the isomerization intensity of cyclohexane. The authors explain the results in case 1) as follows: 1) The water possibly blocks the catalytic surface, in spite of its negligible concentration in H<sub>2</sub>. In this case, the adsorption of water had to be much greater than that of benzene; 2) the semiconductor properties of WS<sub>2</sub> are changed by water which is known to have either acceptor or donor properties,

Card 2/6

S/020/61/137/003/020/030  
B103/B208

Effect of oxygen and water on ...

depending on the kind of adsorbent. The authors believe that the concentration of free electrons on the catalyst surface is reduced by adsorption of water, and the hydrogenation of benzene is thus retarded; 3) the inhibitory effect of  $O_2$  is hardly due to surface blocking. The semiconductor properties of the catalyst are more likely to be changed by  $O_2$  which is known to be an acceptor of free electrons on various semiconductors; 4)  $H_2$  with traces of water (or  $O_2$  which are transformed to water) accelerates the reactions proceeding according to the ionic mechanism. The increasing activity of isomerization in case 2) is thus explicable. The authors conclude from their results that reactions 1) and 2) may be "regulated" with respect to the selectivity of the catalyst. They assume that this "regulation" may also be effective in the hydrogenation of other compounds on other sulfide catalysts. Ye. A. Udal'tsova and Yu. I. Ryzhov took part in this study. A paper by I. A. Makarov is mentioned. There are 2 tables and 6 Soviet-bloc references.

Card 3/6

Effect of oxygen and water on .:

S/020/61/137/003/020/030  
B103/B208

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo  
Akademii nauk SSSR (Institute of Organic Chemistry imeni  
N. D. Zelinskiy of the Academy of Sciences USSR)

PRESENTED: November 11, 1960, by B. A. Kazanskiy, Academician

SUBMITTED: November 4, 1960

Card 4/6



15-8600

2209, also 1372, 2108

21978  
S/020/61/137/005/022/026  
B101/B203

AUTHOR: Gonikberg, M. G.

TITLE: Use of high pressure to study collective interaction in polymerization processes

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 5, 1961, 1147-1148

TEXT: Collective interactions are studied by taking account of the fact that the influence of high pressure on the reaction rate may lead to certain conclusions on the structure of the transition state. Proceeding from the equation  $(\partial \ln k / \partial P)_T = -\Delta v^\ddagger / RT$  (1) for the pressure dependence of the reaction rate constant ( $\Delta v^\ddagger$  is the volume change on formation of the transition state from the initial substances), the following is concluded: With the interaction of  $n$  particles,  $\Delta v^\ddagger$  will be  $(n - 1)$  times larger than in the interaction of only two particles. The data on polymorphous conversion of diamond to graphite presented by Wantorf at the 17th International Congress on Pure and Applied Chemistry in August,

Card 1/3

21978

S/020/61/137/005/022/026  
B101/B203

Use of high pressure to study ...

1959, are mentioned; this conversion is accompanied by an increase in volume and, therefore, it is retarded at high pressure. Polymerization processes are assumed to be accompanied by a decrease in volume. This decrease will be high if a collective interaction of particles occurs in the transition state. High pressure will then accelerate the process. By investigating the polymerization under high pressure, it should be possible to determine the number of collectively reacting particles. On the basis of the thermodynamic equations for entropy and enthalpy, the

author writes down:  $(\partial E / \partial P)_T = \Delta v^\ddagger - T(\partial \Delta v^\ddagger / \partial T)_P$  (4);  $(\partial \ln A / \partial P)_T = -(1/R)(\partial \Delta v^\ddagger / \partial T)_P$  (5). It is concluded from Wantorf's data that  $\Delta v^\ddagger$  is little influenced by temperature in the conversion of diamond to graphite. Thus, in the range investigated (1700-2200°C), the number of collectively interacting particles is not noticeably influenced by temperature. The clarification of this problem is important for a study of the mechanism of collective interactions. There are 11 references: 5 Soviet-bloc and 6 non-Soviet-bloc. The two references to English-language publications read as follows: C. Walling, J. Peisach, J. Am. Chem.

Card 2/3

21978

S/020/61/137/005/022/026  
B101/B203

Use of high pressure to study ...

Soc., 80, 5819 (1958); H. P. Bovenkerk, F. P. Bundy et al., Nature,  
184, 1094 (1959).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii  
nauk SSSR (Institute of Organic Chemistry imeni N. D.  
Zelinskiy, Academy of Sciences USSR)

PRESENTED: December 6, 1960, by B. A. Kazanskiy, Academician

SUBMITTED: December 1, 1960

X

Card 3/3

GONIKBERG, M.G.; EL'YANOV, B.S.

Steric hindrance in Merchutkin's reactions. Dokl. AN SSSR 138  
no.5:1103-1106 Jo '61. (MIRA 14:6)

1. Institut organicheskoy khimii im. M.D.Zelinskogo AN SSSR.  
Predstavleno akademikom B.A.Kazanskim.  
(Steric hindrance)

KRICHEVSKIY, Isaak Ruvimovich; GONIKBERG, M.G., red.; SHPAK, Ye.G.,  
tekhn. red.

[Fundamental concepts of thermodynamics] Poniatiia i osnovy  
termodinamiki. Moskva, Goskhimizdat, 1962. 443 p.  
(MIRA 16:3)

(Thermodynamics)

GONIKBERG, M.G., ZHULIN, V.M., EL"YANOV, B.S.

"Study of steric effects in chemical reactions by means of high pressure."

Report to be submitted for the 3rd Congress, European Federation of  
Chemical Engineering  
London, England 20-29 Jun 62

S/120/62/000/001/046/061  
E039/E485

AUTHORS: Shakhovskoy, G.P., Lavrov, I.A., Pushkinskiy, M.D.  
Gonikberg, M.G.

TITLE: Apparatus for determining the compressibility of  
liquids

PERIODICAL: Pribery i tekhnika eksperimenta, no.1, 1962, 181-183

TEXT: The apparatus consists of a metallic sylphon bellows filled with the liquid under investigation and subjected to external hydraulic pressure. The change in length of the sylphon bellows is proportional to the change in volume of the contained liquid under the applied pressure. A wire with high electrical resistance is attached to the bottom of the bellows and slides along a contact fixed to the outer containing wall of the apparatus. By passing a current through the wire, potentiometric measurements can be made between the sliding contact and the end of the wire, hence giving a measure of the change in length of the bellows. A correction is made for the change in resistance of the wire with pressure. Data is given on the compressibility of distilled water at 0°C and compared with the results of Bridgeman  
Card 1/2

Apparatus for determining ...

S/120/62/000/001/046/061  
E039/E485

(see Table). The maximum difference between the authors' results and those of Bridgeman is 0.12%. Yu.A.Rumyantsev participated in the work. There 2 figures and 1 table.

ASSOCIATION: Institut organicheskoy khimii AN SSSR  
(Institute of Organic Chemistry AS USSR)

SUBMITTED: June 15, 1961

Card 2/2



S/065/62/000/004/001/004  
E075/E136

AUTHORS: ~~Gonikberg~~, M.G., Dorogochinskiy, A.Z.,  
Mitrofanov, M.G., Gavrilova, A.Ye., Dronin, A.P.,  
Kupriyanov, V.A., Makar'yev, S.V., Zamanov, V.V.,  
and Vovk, L.M.

TITLE: A process of thermal dealkylation of aromatic  
hydrocarbons

PERIODICAL: Khimiya i tekhnologiya topliv i masel,  
no.4, 1962, 11-15

TEXT: As a result of investigations carried out in the  
years 1953-1960 in IOKh AN SSSR and GrozNII, a technological  
scheme was developed for an industrial process of thermal  
dealkylation of monocyclic aromatics such as toluene and methyl-  
naphthalenes. A pilot plant for the process producing  
30 000 tons of benzene per annum consists of a small number of  
simple units. It contains a tubular furnace of only  
3 mil. cal/hour capacity. The main production indices for the  
plant are as follows: reactor pressure 50 atm; maximum  
temperature 790 °C; separator temperature 35 °C;  
Card 1/2

✓

A process of thermal dealkylation... S/065/62/000/004/001/004  
E075/E136

pressure in benzene column 0.1-0.3 kg/cm<sup>2</sup>; temperature in benzene column, top 87 °C, bottom 130 °C; pressure in the recycle stock separation column 0.1-0.3 kg/cm<sup>2</sup>; temperature in the recycle stock separation column, top 260°, bottom 304 °C; molar ratio hydrogen/feedstock 4:1; space velocity of feed 4.0 h<sup>-1</sup>; consumption of hydrogen 2.1% wt of feedstock; yield of benzene 78.7% wt of toluene. It was calculated that high grade benzene produced by the process from petroleum derived toluene is considerably cheaper than that obtained currently in the coking industry. It was established that thermal demethylation of methyl naphthalenes (700 °C, 50 atm) gives naphthalene with a yield of ca. 50% wt of feedstock after one cycle. The most suitable raw materials for the process are aromatic products obtained during reforming, pyrolysis and catalytic cracking processes. It is expected that the dealkylation process will constitute an important source of benzene and naphthalene for the Soviet petro-chemical industry. There are 1 figure and 1 table.

Card 2/2

LEVITSKIY, I.I.; UDAL'TSOVA, Ye.A.; GONIKBERG, M.G.

Production of pure cyclohexane by the catalytic hydrogenation of benzene containing thiophene. Zhur.prikl.khim. 35 no.1:204-206 Ja '62. (MIRA 15:1)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.  
(Cyclohexane) (Benzene) (Hydrogenation)

ZHULIN, V.M.; GONIKBERG, M.G.; ZAGORBININA, V.N.

Homolytic telomerization of vinyl acetate with tetrachloroethylene  
at high pressures. Izv. AN SSSR Otd.khim.nauk no.4:716-720 Ap  
'62. (MIRA 15:4)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Vinyl acetate) (Ethylene) (Polymerization)

GONIKBERG, M.G.; DOROGOSHINSKIY, A.Z.; MITROFANOV, M.G.; GAVRILOVA, A.Ye.;  
DRONIN, A.P.; KUPRIYANOV, V.A.; MAKAR'YEV, S.V.; ZAMANOV, V.V.;  
VOVK, L.M.

Thermal dealkylation of aromatic hydrocarbons. Khim.i tekhn.topl.  
i masel 7 no.4:11-15 Ap '62. (MIRA 15:4)  
(Hydrocarbons) (Alkyl groups)

GONIKBERG, M.G.; BAYKOVA, R.I.; ZHULIN, V.M.

Homolytic copolymerization of vinyl acetate and trichloroethylene  
at high pressures. Izv.AN SSSR.Otd.khim.nauk no.7:1164-1169  
Jl '62. (MIRA 15:7)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Vinyl acetate) (Ethylene) (Polymerization)

LEVITSKIY, I.I.; GONIKBERG, M.G.; MINACHEV, Kh.M.; KONDRAT'YEV, D.A.

Water promoted platinum-alumina catalyst. Report No.1:  
Hydrogenation of benzene. Izv.AN SSSR.Otd.khim.nauk no.7:1169-  
1174 J1 '62. (MIRA 15:7)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Benzene) (Hydrogenation) (Catalysts)

GONIKBERG, M.G.; GAVRILOVA, A.Ye.; STERLIGOV, O.D.; ROZHKOVA, M.I.

Thermal polymerization of pentenes at high pressures. Izv.AN SSSR.  
Otd.khim,nauk no.8:1458-1463 Ag '62. (MIRA 15:8)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Pentene) (Polymerization)



GONIKBERG, M.G.; PROKHOROVA, N.I.; LITVIN, Ye.F.

Effect of high pressure on the steric orientation of homolytic  
aromatic substitution. Izv.AN SSSR,Otd.khim.nauk no.8:1495  
Ag '62. (MIRA 15:8)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Aromatic compounds) (Substitution (Chemistry))

EL'YANOV, B.S.; GONIKBERG, M.G.

Relation between the rate constants and equilibrium constants  
of reactions in solutions under pressure. Zhur. fiz. khim. 36  
no.3:604-607 Mr '62. (MIRA 17:8)

1. Institut organicheskoy khimii imeni Zolinskogo AN SSSR.

GONIKBERG, M.G.; FAYESHEYN, I.Z.

Effect of pressure on the rate of A.E. Arbusov reactions. Dokl.  
AN SSSR 147 no.3:612-614 N '62. (MIRA 15:12)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.  
Predstavleno akademikom B.A. Kazanskim.  
(Rearrangements (Chemistry)) (Chemical reaction, Rate of)

IEVITSKIY, I.I.; GONIKBERG, M.G.; MINACHEV, Kh.M.; KONDRATIYEV, D.A.

Water-promoted alumina-platinum catalysts. Report No.2:  
Dehydrogenation of cyclohexane. Izv.AN SSSR Otd.khim.nauk  
no.5:798-801 My '63. (MIRA 16:8)

1. Institut organicheskoy khimii AN SSSR.  
(Cyclohexane) (Dehydrogenation) (Platinum catalysts)

GONIKBERG, M.G.; DOROGUCHINSKIY, A.Z.; GAVRILOVA, A.Ye.; KOMANENKOVA, R.A.;  
MITROFANOV, M.G.; KUPRIYANOV, V.A.

Determination of the naphthalene and alkyl naphthalene content of  
stocks and dealkylation products. Neftekhimiia 3 no.6:916-921 N-D  
'63. (MIRA 17:3)

1. Institut organicheskoy khimii AN SSSR im. N.D.Zelinskogo i  
Groznerskiy neftyanoy nauchno-issledovatel'skiy institut.

LEVITSKIY, I.I.; GONIKBERG, M.G.; MINACHEV, Kh.M.; KONDRAT'YEV, D.A.

Effect of water on the activity of alumina-platinum catalysts  
with various metal content. Izv. AN SSSR. Ser. khim. no.11:  
2065-2066 N '63. (MIRA 17:1)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.

SHAKHOVSKOY, G.P.; LAVROV, I.A.; GONIKBERG, M.G.; RUMYANTSEV, Yu.A.

Apparatus for viscosity measurements under pressure. Prib. i  
tekh. eksp. 8 no.5:203-207 9-0 '63. (MIRA 16:12)

1. Institut organicheskoy khimii AN SSSR.

S/076/63/037/003/001/020  
B101/B215

AUTHOR: Gonikberg, M. G.

TITLE: Kinetics of chemical reactions at high pressures

PERIODICAL: Zhurnal fizicheskoy khimii, v. 37, no. 3, 1963, 477-489

TEXT: This is a discussion of some aspects of the kinetics of chemical reactions at high pressures based on the theory of transition by M. G. Evans, M. Polanyi (Trans. Faraday Soc., 31, 875, 1935). Referring to previous publications the author shows that this theory is suitable for explaining a number of experimental facts. It is remarked that in the field of high-pressure synthesis, many problems still remain unsolved especially as regards reactions in the solid phase. There are 4 figures, 4 tables, and 31 references. The most important English-language references are: S. D. Hamann, Physico-chemical effects of pressure, London, 1957; J. M. Stewart, K. E. Weale, Proc. Chem. Soc., 389, 1961.

ASSOCIATION: Akademiya nauk SSSR Institut organicheskoy khimii N. D. Zelinskogo (Academy of Sciences USSR Institute of Organic Chemistry imeni N. D. Zelinskiy)

Card 1/2



Kinetics of chemical reactions at high ...

S/076/63/037/003/001/020  
B101/B215

SUBMITTED: September 17, 1962

Card 2/2

GONIKBERG, M.G.; SHAKHOVSKOY, G.P.; LIBERMAN, A.L.; VASINA, T.V.

Compressibility of cis- and trans-1,3-dimethylcyclohexanes. Zhur.  
fiz.khim. 37 no.8:1891-1893 Ag '63. (MIRA 16:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
(Cyclohexane) (Compressibility)

RELEASE: 06/13/2000

CIA-RDP86-001/022/032  
S/020/03/86-00513R000516020002-5  
B144/B186

AUTHORS:

Gonikberg, M.G., Prokhorova, N.I., Litvin, Ye.F.

TITLE:

Effect of high pressure on the structural trend of  
tert-butyl benzene phenylation

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 148, no. 1, 1963, 105-108

TEXT: The phenylation of tert-butyl benzene with benzoyl peroxide under various pressures was studied to confirm the assumption that an increase in pressure increases the portion of ortho-isomer, which is supported by various publications. The method by J.I. Cadogan et al. (J. Chem. Soc., 1954, 3352) using atmospheric pressure was repeated. The isomer mixture, however, was separated by gas - liquid chromatography in a column, 2 m long and of 5 mm diameter, containing 15% polyethylene glycol adipate on diatomite at 170°C, with helium serving as gas carrier (50 ml/min). The material of the reaction vessel (glass, steel) did not affect the isomer mixture. The total yield of 42.6% was approximately equal to Cadogan's value whereas the 2-isomer proportion was lower (17% as compared to 24%). The absence of secondary reactions of tert-butyl

S/020/63/148/001/022/032  
B144/B186

Effect of high pressure on the ...

diphenyls was proved by the constant composition of the isomer mixture during the individual stages of reaction. Experiments at a pressure of 2000 kg/cm<sup>2</sup> yielded 23.1% 2-isomer. The use of lead ampoules increased the yield in 2-isomer by 2% at atmospheric pressure and also at 2000 kg/cm<sup>2</sup>. At a pressure of 4000 kg/cm<sup>2</sup>, the yield in 2-isomer was 28.3%, at 6000 kg/cm<sup>2</sup> it was ~30%. Results: An increase from atmospheric pressure to 6000 kg/cm<sup>2</sup> caused: (1) An increase in ratio 2-isomer : (3 + 4) isomers by more than 70%; (2) doubling of the 2 : 4 isomer ratio; (3) slight increase in the 3 : 4 isomer ratio. Conclusions: A pressure increase may affect the structural development of the reaction by accelerating the formation of the isomer in direction of the steric hindrance. The change in the 2 : 4 isomer ratio at increasing pressure may be calculated from  $\partial \log ([2]/[4])/\partial P = \Delta \Delta V^{\ddagger}/RT$ , where [2] and [4] are the concentrations of 2-tert-butyl diphenyl and 4-tert-butyl diphenyl, respectively, and  $V^{\ddagger}$  is the volume change when 1 mole of the active complex is obtained from the initial particles. So far, the effect of Pb on the isomer composition has not been explained. There are 2 tables. ✓

Card 2/3

GONIKBERG, M.G.; GAVRILOVA, A. Ye.; ALEKSEYEV, Ye.F.; KOMANENKOVA, R.A.

Homogenous demethylation of methyl naphthenes. Neftokhimiya  
4 no.2: 252-256 Mr-8p'64 (MIRA 17:8)

1. Institut organicheskoy khimii AN SSSR imeni Zelinskogo

ACCESSION NR: AP4037244

S/0062/64/000/005/0914/0917

AUTHOR: Alekseyev, Ye. F.; Gonikberg, M. G.

TITLE: Ethylene polymerization on a chromic oxide catalyst at high pressure

SOURCE: AN SSSR. Izv. Seriya khimicheskaya, no. 5, 1964, 914-917

TOPIC TAGS: ethylene, polymerization, high pressure polymerization, chromic oxide catalyst, dew point determination, apparatus, automatic photoelectric indicator, heterogeneous catalytic polymerization, solution polymerization, monomer purification, polyethylene, molecular weight

ABSTRACT: An improved method was developed for determining the dew point of ethylene. In the automatic photoelectric indicator (fig. 1) the photo current drops sharply at the dew point as the condensate forms on the mirror. The temperature of the mirror surface is then measured within 1C. A laboratory method was worked out for the heterogeneous-catalytic high pressure polymerization of ethylene in liquid solution at 35 and 240 kg/cm<sup>2</sup>. Since the dew point of ethylene at the higher pressures rises to -20C (from -84C at 35 kg/cm<sup>2</sup>), the monomer for polymerization at the higher pressure was purified at 35 kg/cm<sup>2</sup>. Polymerization was conducted in

Card

1/41

LEVITSKIY, I.I.; GONIKBERG, M.G.; MINACHEV, Kh.M.; BOGOMOLOV, V.I.

Change of rate and direction of hydrogenolysis of methylcyclopentane in the high-temperature hydrogen treatment of an alumina-platinum catalyst.  
Dokl. AN SSSR 158 no.5:1123-1126 O '64. (MIRA 17:10)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR. Predstavleno akademikom B.A.Kazanskim.

EL'YANOV, B.S.; RUDENKO, B.A.; GONIKBERG, M.G.; KUCHEROV, V.F.

Effect of pressure on the structural and steric orientation of diene synthesis. Report No.1: Condensation of 1-vinylcyclopentene with methyl acrylate. Izv. AN SSSR. Ser. khim. no.6:1082-1089 Je '64. (MIRA 17:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.

GONIKBERG, M.G.; PROKHOROVA, N.I.

Effect of pressure on the rate of aromatic nucleophilic substitution.  
Izv. AN SSSR. Ser. khim. no.6:1110-1112 Je '64.

(MIRA 17:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.



ZHULIN, V.M.; BAYKOVA, R.I.; ~~GONIKBERG, M.G.~~

Unusual effect of pressure on radical polymerization. Izv. AN SSSR.  
Ser. khim. no.6:1133 Je '64.

(MIRA 17:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.

FAYNSHTEYN, I.Z.; GONIKBERG, M.G.

Pressure effect on the rate of A.E. Arbuzov's rearrangement  
in solution. Izv. AN SSSR. Ser. khim. no.8:1401-1406 Ag '64.  
(MIRA 17:9)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.

L 16931-65 ENT(m)/EPF(c)/EWP(j)/T PC-4/Pr-4 AEDG(a)/SSD(c) RM

ACCESSION NR: AF5002834

S/0062/64/000/008/1401/1406

AUTHOR: Fynghteyn, I. Z., Gonikberg, M. G.

6

TITLE: Effect of pressure on the A. Ye. Arbuzov rearrangement rate in solution

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 8, 1964, 1401-1406

TOPIC TAGS: isomerization, phosphide, pressure effect, reaction rate, toluene

Abstract: Isomerization of triethylphosphides in the presence of ethyl iodide

in toluene solution was studied at 80° and at pressures up to 2000 kg/cm<sup>2</sup>. At these conditions the determining rate of the process was the rate of the first stage of the reaction. The rate of isomerization increases with increasing pressure. The data obtained are in good agreement with the results of other authors. The rate constant of the first stage of the reaction increases with increasing pressure. The rate constant of the second stage of the reaction is independent of pressure. The activated complex after the first stage of the reaction in toluene solution apparently is solvated by more than one toluene molecule. Orig. art. has 5 graphs and 1 table.

Card 1/1

L 16931-65

ACCESSION NR: AP5002834

INSTITUTION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR  
(Institute of Organic Chemistry, Academy of Sciences, USSR)

CONTROL

ENCL: 00

SUB CODE: 00, 00

OTHER: 003

003

L 01774-65 EPF(c)/EPR/EWP(j)/EWT(m)/T Pc-4/Pr-4/Ps-4 PPL/LSD(m)-1/AFETR

ACCESSION NR: AP4044704

S/0052/64/000/008/1497/1500

Author: Znudin, V. M.; Pen'kova, M. P.; Kozlov, A. A.; Gonikberg, M. G.

TITLE: Polymerization of  $\alpha$ -methylacrolein at high pressures

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 8, 1964, 1497-1500

TOPIC TAGS: alpha methylacrolein, polymerization, high pressure polymerization, heterogeneous polymerization, homogeneous polymerization, radical polymerization

ABSTRACT: The heterogeneous polymerization of  $\alpha$ -methylacrolein in methanol (1:1 ratio) using 0.10%  $\alpha$ ,  $\alpha'$ -bisazodinitrile of isobutyric acid, based on weight of monomer) was investigated at 60C and atmospheric and elevated pressures of 100-1000 kg/cm<sup>2</sup>. The product formed at the 100 kg/cm<sup>2</sup> pressure was soluble in water and dimethylformamide, the high pressure products were not. IR spectra showed all products contained ether, vinyl, aldehyde and hydroxyl groups, it was concluded the polymeric chain growth was caused by addition of radicals to the C=C and to the C=O bonds of the monomer molecule. The polymeriza-

Cont. 1/2

L 21778-65

ACCESSION NR: AP4044704

tion rate under the conditions of the investigation increased linearly in proportion to the increase in polymer yield to about 30% conversion. At 2000 kg/cm<sup>2</sup> pressure the initial polymerization rate was increased 6.4 times and at the same time the polymerization was accelerated 5.6 times in proportion to the accumulated polymer yield. The following relationship was found to exist:  $\lg v_t = \lg v_0 + 1.17 a$ , where  $v_t$  is the polymer yield,  $v_0$  is the initial polymerization rate,  $a$  is the reaction order, and  $a$  is the slope of the straight line determining acceleration of the polymerization due to the accumulation of polymer. The results of the investigation confirm the hypothesis of heterogeneous polymerization, which is characterized by a greater rate of polymerization than homogeneous polymerization. The author is grateful to Prof. V. I. Zolotarev, to whom is expressed sincere thanks. Orig. art. has: 1 table, 2 equations and 1 table.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry, Academy of Sciences, SSSR) Moskovskiy Institut (Moscow Textile Institute)

RECEIVED: 26Dec62

ENCL: 00

SUB CODE: MT, GC

NO REF SOV: 002

OTHER: 004

Card2/2

ZHULIN, V.M.; GONIKBERG, M.G.; BAYKOVA, R.I.

Radical polymerization of vinyl acetate and its telomerization  
with carbon tetrachloride at high pressures. Izv. AN SSSR. Ser.  
khim. no.3:432-438 '65. (MIRA 18:5)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.

PROKHOROVA, N.I.; GONIKBERG, M.G.

Nucleophilic aromatic substitution at high pressure. Izv. AN SSSR. Ser.  
khim. no.7:1188-1193 '65. (MIRA 18:7)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.



GONINBERG, M.G.; SHAKHOVSKOY, G.P.

Viscosity and density of nitrobenzene - N-methylaniline and  
nitrobenzene - pyridine mixtures at high pressures. Zhur. fiz.  
khim. 39 no.2:468-470 F '65. (MIRA 18:4)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.

L 1858-66 EWT(1)/EWT(m)/EPF(c)/ENP(j)/ENA(b)-2 RM/BW/WW/RO  
 ACCESSION NR: AP5022935 UR/0062/65/000/008/1469/1471  
 541.12.034.2  
 AUTHOR: Gonikberg, M. G.; Faynshteyn, I. Z.  
 TITLE: The effect of pressure on the thermal decomposition of methyltriphenoxy-  
 phosphonium iodide  
 SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 8, 1965, 1469-1471  
 TOPIC TAGS: nerve gas, chemical warfare, reaction mechanism, phosphite phosphonate  
 rearrangement, quaternary phosphorus compound, phosphonate ester, cholinesterase in-  
 hibitor, phosphonium compound  
 ABSTRACT: Previous work showed that pressure increases exert a considerable  
 accelerating effect on the Arbuzov rearrangement. It was suggested that the accel-  
 erating effect is exerted on the first step of the reaction, i.e., the formation of  
 the intermediate  $[\text{CH}_3\text{P}(\text{OC}_6\text{H}_5)_3]^+\text{I}^-$  from triphenyl phosphite and methyl iodide. To  
 test the validity of the above suggestion, the intermediate was prepared by heating  
 the components for 2.5 hr at 130C in a sealed ampul. Methyltriphenoxyphosphonium  
 iodide was purified by recrystallization and subjected to thermal decomposition at  
 200C and pressures up to 2000 kg/cm<sup>2</sup>. It was found that raising the pressure pro-  
 Card 1/2

L 1858-66

ACCESSION NR: AP5022935

duces no noticeable effect on the rate of thermal decomposition of methyltriphenoxyphosphonium iodide at 200C. The observed effect does not provide a clear indication of whether the overall reaction is governed by the  $S_N1$  or the  $S_N2$  mechanism. Orig. art. has: 1 table. [VS]

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo, Akademii nauk SSSR (Institute of Organic Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 20Nov64

ENCL: 00

SUB CODE: CB, OC

NO REF SOV: 007

OTHER: 003

ATD PRESS: 4087

Card 2/2

ENT(c)/EPF(c)/ENP(3)/T RM

21

Effect of pressure on the reaction rate constants of chain transfer during radical polymerization of styrene

SOURCE: AN SSSR, Doklady, v. 163, no. 1, 1965, 126-129

TAGS: radical polymerization, reaction rate constant, chain transfer, chain growth, styrene, polymer radical, covalent bond, transfer agent, butyric aldehyde, isobutyric aldehyde, monomer, polymerization pressure, activated complex

ABSTRACT: Theory implies that in the process of the polymerization of vinyl monomers the ratio between the rate constants of chain transfer and growth of the chain may vary differently with increasing pressure as a function of the mechanism and structure of the transfer agent and chain transfer reaction. The basis for this assumption is that the processes of chain growth are similar reactions of the addition of polymer radicals to form covalent bonds, whereas the mechanisms of the reactions of chain transfer may markedly differ.

Card 1/3

ACCESSION NR: AP5018082

To verify this assumption, the authors investigated the radical polymerization of styrene in the presence of butadiene-1,3. The results of the experiments carried out in the presence of butadiene-1,3 are given in Table 1. It is seen from the data that the rate of polymerization of styrene in the presence of butadiene-1,3 is higher than in the absence of this diene.

In the work by the authors (Izv. AN SSSR, Khim. 1961, 1962) it was found that the polymerization of styrene in the presence of butadiene-1,3 is symmetric to the polymerization of butadiene-1,3 in the presence of styrene. This is in agreement with the results of the experiments carried out in the presence of butadiene-1,3.

The rate of chain transfer across butadiene-1,3 is only 3.6 times for the polymerization of styrene in the presence of butadiene-1,3. This is in agreement with the results of the experiments carried out in the presence of butadiene-1,3.

The results of the experiments carried out in the presence of butadiene-1,3 show that the rate of chain transfer across butadiene-1,3 is only 3.6 times for the polymerization of styrene in the presence of butadiene-1,3. This is in agreement with the results of the experiments carried out in the presence of butadiene-1,3.

Card 2/3

AP 5018082

... include an additional negative ...  
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... Institut organicheskoy khimii ...  
...  
...

Card 3/3

BAYKOVA, R.I.; ZHULIN, V.M.; GONIKBERG, M.G.

Pressure effect on the radical polymerization of acrylonitrile  
in dimethylformamide solution. Izv. AN SSSR. Ser.khim. no.1:154-  
156 '66. (MIRA 19:1)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.  
Submitted May 11, 1965.

L 36989-66 EWP(j)/EWT(m)/T RM/WW

ACC NR: AP6008507

SOURCE CODE: UR/0062/66/000/001/0154/0156

AUTHOR: Baykova, R. I.; Zhulin, V. M.; Gonikberg, M. G.

ORG: Institute of Organic Chemistry im. N. D. Zelinskiy, Academy of Sciences,  
SSSR (Institut organicheskoy khimii Akademii nauk SSSR)

TITLE: Effect of pressure on radical polymerization of acrylonitrile in a solution of dimethylformamide

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 1, 1966, 154-156

TOPIC TAGS: pressure effect, radical polymerization, acrylonitrile

ABSTRACT: The authors, having found that pressure has an unusual effect on heterogeneous radical polymerization of acrylonitrile, e.g., an increase of pressure from atmospheric to 2000 kg/cm<sup>2</sup> at 50C leads to a decrease of the rate of polymerization and molecular weight of the polymer by a factor of 2.5 and 3.2 respectively, attempted to obtain data on the effect of pressure on homogeneous polymerization of acrylonitrile. This article gives the results of an investigation of polymerization of acrylonitrile in a solution of dimethylformamide initiated by dinitrile of azoisobutyric acid at atmospheric pressure and at 2000 kg/cm<sup>2</sup>. The experiment demonstrated that the rate of homogeneous radical polymerization of acrylonitrile in dimethylformamide at 50C, unlike heterogeneous radical

Card 1/2

UDC: 539.893+542.952+531.1



L 36989-66

ACC NR: AP6008507

polymerization of acrylonitrile, increases with an increase of pressure from atmospheric to 2000 kg/cm<sup>2</sup> by a factor of 4 and the average molecular weight of the polymer by a factor of 1.5. The authors explain the comparatively small increase of molecular weight at 2000 kg/cm<sup>2</sup> by the fact that in the studied system an appreciable role is played by the reaction of chain transfer through dimethylformamide and this reaction is accelerated by pressure almost to the same extent as the reaction of chain growth. Orig. art. has: 1 figure and 1 table.

SUB CODE: 07/ SUBM DATE: 11May65/ ORIG REF: 005/ OTH REF: 001

Card 2/2

L 36501-66 EWT(m)/EWP(j)/T IJP(c) RM

ACC NR: AP6017875

(A)

SOURCE CODE: UR/0062/66/000/005/0827/0832

AUTHOR: Zhulin, V. M.; Gonikberg, M. G.; Zagorbinina, V. N.

ORG: Institute of Organic Chemistry im. N. D. Zelinskiy, Academy of Sciences, SSSR  
(Institut organicheskoy khimii Akademii nauk SSSR)

TITLE: Study of the effect of pressure on the radical polymerization of styrene in solution. Report No. 1: Polymerization in benzene, butyraldehyde, and their mixtures.

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 5, 1966, 827-832

TOPIC TAGS: radical polymerization, styrene, aliphatic aldehyde, organic nitrile compound, organic azo compound

ABSTRACT: Radical polymerization of styrene, initiated with azoisobutyrodinitrile, was studied at pressures up to 2000 kg/m<sup>2</sup> in benzene, butyraldehyde, and their mixtures at 50°C. The rate and average degree of polymerization in benzene solution increase by factors of 4.2 and 6.5 respectively as the pressure is raised from atmospheric to 2000 kg/cm<sup>2</sup>. The effect of pressure decreases with increasing butyraldehyde content of the mixture. On the basis of data on the influence of pressure on the rate and average degree of polymerization of styrene in benzene, the value of the volume activation effect during initiation ( $\Delta V_{in}^{\ddagger}$ ) at atmospheric pressure was calculated. This value (+7.4 cm<sup>3</sup>/M) was found to be close to that reported in the lit-

UDC: 541.12.034.2 + 542.95

Card 1/2

L 36501-66

ACC NR: AP6017875

erature for the decomposition of azoisobutyronitrile in toluene solution at 62.5° (+9.4 cm<sup>3</sup>/M). A study of the dependence of the average degree of polymerization on the butyraldehyde/styrene ratio at various pressures led to the conclusion that the rate constant of chain growth in the polymerization of styrene increases with rising pressure to a considerably greater degree than does the rate constant of chain transfer via butyraldehyde. Orig. art. has: 2 figures, 2 tables, and 5 formulas.

SUB CODE: 07/11/SUBM DATE: 08Jan64/ ORIG REF: 005/ OTH REF: 016

Card 2/2/1LP

I. 11311-66 EWT(m)/EWP(j) RM

ACC NR: AP6024021

SOURCE CODE: UR/0062/66/000/006/1090/1091

AUTHOR: Gonikberg, M. G.; Petrov, A. A.; Aneli, Dzh. N. 563ORG: Institute of Organic Chemistry im. N.D. Zelinskiy, Academy of Sciences, SSSR  
(Institut organicheskoy khimii Akademii nauk SSR)TITLE: Change in certain properties of phenolphthalein<sup>7</sup> and thymolphthalein as a result of plastic deformation under high pressure

SOURCE: AN SSSR. Izv. Ser khim, no. 6, 1966, 1090-1091

TOPIC TAGS: high pressure, plastic deformation, phenolphthalein, thymolphthalein, PHENYL COMPOUND, ELECTRON SPIN RESONANCE, CHEMICAL INDICATOR, CRYSTAL LATTICE DISLOCATION

ABSTRACT: It has been shown earlier that plastic deformation at high pressure in the solid indicators phenolphthalein and thymolphthalein causes the appearance of narrow electron spin resonance (ESR) signals which are stable at room temperature and vanish almost entirely on heating to 100°. The stresses caused by the shear in the crystals led to an irreversible disordering of the crystal lattice. Continuing this study, the authors attempted to determine the dependence of the shearing force on the pressure, and to explain the attendant change in the concentration of unpaired electrons. The plastic deformation of the indicators was carried out at pressures up to 50 kbar. In the study of shearing force versus pressure, the presence of abrupt irreversible changes was observed at 12-15 and 14-16 kbar; x-ray diffraction analysis showed that these changes represent a disordering of the crystal lattices of the indicators. Plastic

Card 1/2

UDC: 541.12.034.2+541.51

L 41314-66

ACC NR: AP6024021

deformation of the latter under high pressures was found to cause the appearance of unpaired electrons: in phenolphthalein, their concentration increases from  $10^{14}$ - $10^{15}$  g<sup>-1</sup> at ~23 kbar to  $\sim 10^{17}$  g<sup>-1</sup> at 50 kbar; in thymolphthalein, from  $10^{14}$ - $10^{15}$  g<sup>-1</sup> at ~17 kbar to  $\sim 10^{17}$  g<sup>-1</sup> at 50 kbar. Orig. art. has: 1 figure.

SUB CODE: 07,11/ SUBM DATE: 11Nov65/ ORIG REF: 002/ OTH REF: 002

Card 2/2 hs

PHASE I BOOK EXPLOITATION

SOV/5062

Gipp, B.A., Ye.M. Gonikberg, M.M. Kaplun, Ye. M. Levenson, N.N. Markov, P.M. Polyanskiy, and G.S. Shlezinger

Kontrol'nyye prispособleniya (Inspection Equipment) Moscow, Mashgiz, 1960. 338 p.  
Errata slip inserted. (Series: Progressivnyye sredstva kontrolya razmerov v mashinostroyeni)

Scientific Ed.: Ye. M. Levenson; Ed. of Publishing House: L.G. Prokof'yeva;  
Tech. Ed.: A.Ya. Tikhanov; Eds. for the Series: B.S. Bayburov, M.I. Kochenov,  
and D.D. Malyy; Managing Ed. for Literature on Chemical- and Textile-Machine  
Building: V.I. Rybakova, Engineer.

PURPOSE: This book is intended for designers and technical personnel in the machine-building industry.

COVERAGE: The book discusses in detail the design of basic subassemblies and parts of inspection equipment which have proved valuable in shop practice. Various devices for the inspection of dimensional and nondimensional parameters of parts used in machine building are described. The book is a part of a group of works

Card 1/5

# Inspection Equipment

SOV/5062

on modern means for inspection in manufacturing processes, the publication of which was recommended by the Commission for the Introduction of Progressive Methods and Means of Inspection in Machine Building of the State Scientific and Technical Committee of the Council of Ministers of the USSR. No personalities are mentioned. There are 27 references, all Soviet.

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Card 2/5

GRIGOR'YEV, Mikhail Aleksandrovich, kand. tekhn. nauk; POKROVSKIY, Georgiy Pavlovich, kand. tekhn. nauk; GONIKBERG, Ye.M., inzh., retsenzent; ZHURAVLEVA, M.N., inzh., red.; TIKHANOV, A.Ya., tekhn. red.

[Centrifuges used in automobiles and tractors; theory, design and operation] Avtomobil'nye i traktornye tsentrifugi; teoriya, konstruktsiya, raschet i ekspluatatsiya. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1961. 180 p. (MIRA 14:11)

(Centrifuges) (Motor vehicles—Engines—Oil filters)



GONIKBERG, Ye.M.

Hydraulic steering actuator for the ZIL motor vehicles. Avt.  
prom. 27 no.10:12-16 0 '61. (MIRA 14:10)

1. Moskovskiy avtozavod imeni Likhacheva.  
(Motor vehicles--Steering gear)

BREN, Kh.; SYRKIN, G.; GONIKBERG, Ye.

Power steering of the ZIL-130 motortrucks. Avt.transp. 40  
no.4:37-41 Ap '62. (MIRA-15:4)

1. Moskovskiy avtozavod im. Likhacheva.  
(Motortrucks--Steering gear)

LYSOV, M.I.; GONIKBERG, Ye.M., inzh., retsenzents; OSEPCHUGOV, V.V.,  
doktor tekhn. nauk, red.

[Steering gear on automobiles] Rulevye upravleniia avto-  
mobilei. Moskva, Izd-vo "Mashinostroenie," 1964. 245 p.  
(MIRA 17:6)

ACC NR: AP7000369

(A)

SOURCE CODE: UR/0413/66/000/022/0156/0156

INVENTOR: Gonikberg, Ye. M.; Bren, Ye. Z.; Brod, B. Z.

ORG: none

TITLE: Hydraulic amplifier built into the steering mechanism of a transport vehicle.  
Class 63, No. 188851 [announced by the Automobile Plant im. I. A. Likhachev  
(Avtomobil'nyy zavod)]

SOURCE: Izobreteniya, promyshlennyye obrastay, tovarnyye znaki, no. 22, 1966, 156

TOPIC TAGS: vehicle component, motor vehicle, hydraulic equipment, ~~transportation equipment~~

ABSTRACT: An Author Certificate has been issued for a hydraulic amplifier built into the steering mechanism of a transport vehicle. It consists of a cylinder with a sliding piston and control-valve housing containing the hollow cylindrical slide valve of a control-piston and a female control shaft fixed by thrust washers relative to the latter in an axial direction and equipped with an annular groove for leading liquid in and out of the cylinder cavity and into the reaction-plunger cavity, which is located in the control-valve housing's orifices. The plungers are pressed by springs and liquid pressure to a fixed cover which interacts with the thrust washers when the control shaft turns. To achieve equal stress on the steering wheel when turning in either direction, the total area of the reaction plungers acting on the control shaft during the supply of liquid to the cylinder cavity (in which is located

Card 1/2

UDC: 629.113.014.514-522.5